

WHAT IS CLAIMED IS:

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1. A dispersion slope equalizer for compensating signal distortion caused by dispersion slope of a transmission
5 line when transmitting lightwaves with plural wavelength signals in the transmission line characterized by comprising:

N (N: natural number) waveguides, N output wavelength demultiplexer and/or N input wavelength multiplexer, and
10 K (K: natural number, $K \leq N$) group delay controllers;

said N waveguides being connected to outputs of said wavelength demultiplexer and/or inputs of said wavelength multiplexer;

in said group delay controllers, one or both of
15 input/output parts of lattice-form optical circuits being set on said N waveguides;

wherein said lattice-form optical circuits are composed of two waveguides interleaved with at least two directional couplers, and said two waveguides are designed
20 so that optical path lengths between said directional couplers are different.

2. The dispersion slope equalizer as claimed in Claim 1, wherein said wavelength demultiplexer and said
25 wavelength multiplexer are arrayed-waveguide gratings.

3. The dispersion slope equalizer as claimed in Claim 1, wherein said group delay controllers are connected to N input wavelength multiplexer and said N waveguides are connected to only inputs of said wavelength multiplexer.

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4. The dispersion slope equalizer as claimed in Claim 3, wherein said wavelength multiplexer is an arrayed-waveguide grating.

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5. The dispersion slope equalizer as claimed in Claim 1, wherein said group delay controllers are connected to N output wavelength demultiplexer and said N waveguides are connected to only outputs of said wavelength demultiplexer.

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6. The dispersion slope equalizer as claimed in Claim 5, wherein said wavelength demultiplexer is an arrayed-waveguide grating.

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7. The dispersion slope equalizer as claimed in Claim 1, wherein said group delay controllers are composed of the combination of the lattice-form and transversal-form optical circuits.

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8. A dispersion slope equalizer for compensating signal distortion caused by dispersion slope of a transmission

line when transmitting lightwaves with plural wavelength signals in the transmission line characterized by comprising:

5 N (N: natural number) waveguides, N output wavelength demultiplexer and/or N input wavelength multiplexer, and N group delay controllers;

said N waveguides being connected to outputs of said wavelength demultiplexer and/or inputs of said wavelength multiplexer;

10 in said group delay controllers, one of inputs and an output of transversal-form optical circuits being set on said N optical waveguides;

wherein the transversal-form optical circuit is provided with first waveguide for one of inputs and M (M: 15 natural number, $M \geq 2$) directional couplers for coupling M waveguides with said first waveguide at M different positions, and said M waveguides, after being coupled with said first waveguide, are multiplexed by a multiplexer into a second output waveguide.

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9. The dispersion slope equalizer as claimed in Claim 8, wherein said wavelength demultiplexer and said wavelength multiplexer are arrayed-waveguide gratings.

25 10. The dispersion slope equalizer as claimed in Claim 8, wherein said group delay controllers are connected to

N input wavelength multiplexer and said N waveguides are connected to only inputs of said wavelength multiplexer.

11. The dispersion slope equalizer as claimed in Claim
5 10, wherein said wavelength multiplexer is an arrayed-waveguide grating.

12. The dispersion slope equalizer as claimed in Claim
10 8, wherein said group delay controllers are connected to N output wavelength demultiplexer and said N waveguides are connected to only outputs of said wavelength demultiplexer.

13. The dispersion slope equalizer as claimed in Claim
15 12, wherein said wavelength demultiplexer is an arrayed-waveguide grating.

14. The dispersion slope equalizer as claimed in Claim
20 8, wherein said group delay controllers are composed of the combination of the transversal-form and lattice-form optical circuits.

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